IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	:	
John C. Parsons	:	Examiner: Peter Y. Choi
U.S. Serial No. 09/883,520	:	Group Art Unit: 1771
Filed: June 18, 2001	:	
Docket No. 1931.VIN (EM-05-2)	:	
For: WATER DISPERSIBLE, SALT SENSITIVE NONWOVEN MATERIALS	:	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

DECLARATION UNDER 37 CFR 1.132

Steven P. Pauls, co-inventor of the subject matter of the above-noted patent application hereby declares that:

1. He has worked in the field of polymer technology for twenty-five (25) years, and that he is a co-inventor of the pending '520 application referenced above (sometimes referred to hereafter simply as the "Present Invention"), which is directed to fibrous webs having salt-sensitive latex binders. He has previously submitted *Declarations* in support of patentability in this case.

2. He understands from Counsel that the claims pending in the above-noted case have been rejected over prior art, specifically that United States Patent No. 5,521,266 to

Lau et al. and United States Patent No. 5,631,317 to *Komatsu et al.* have been applied as novelty-destroying.

3. He makes this *Declaration* on personal knowledge of the facts stated herein.

4. Along with copending US Patent Application No. 09/540,033 (now US Patent No. 6,683,129 to *Eknoian*), the invention in the pending case represents a significant advancement in salt-sensitive technology because the salt-sensitive resins are made by emulsion polymerization. The Present Invention relates to nonwoven webs which include a salt-sensitive latex polymer binder that comprises a polymer component which is typically emulsion polymerized in the presence of a colloid stabilizer. The claims have been amended to specify that films of the binder employed are dispersible rather than water soluble in that a film formed breaks into small discrete particles that can be filtered and in Claim 27 that film formed of the binder is further characterized in that divalent ions do not inhibit redispersibility in water. Claim 22 as amended, and Claim 27 are representative:

> 22. A non-woven material comprising:
>
> a) a web of fibers; and
>
> b) a latex polymer binder applied to the web of fibers, wherein said latex polymer binder has a glass transition temperature of from -40°C to 105°C and comprises:
>
> i) a polymer component which includes from 1 to 100 weight percent of a hydrophilic monomer, and from 0 to 99 percent by weight of at least one non-hydrophilic monomer
>
> and
>
> ii) a polymeric colloid component,
>
> wherein said polymer component is emulsion polymerized using said colloid component as a stabilizer, and
>
> wherein said latex polymer composition forms films that are dispersible rather than soluble in tap water in that a film formed from the polymer breaks into small discrete particles that can be filtered out, and non-

dispersible in aqueous solutions containing 0.5 weight percent or more of an inorganic salt.

27. A non-woven material comprising:

    a) a web of fibers; and

    b) a latex polymer binder applied to the web of fibers, wherein said latex polymer binder has a glass transition temperature of from -40°C to 105°C and comprises a polymer component which includes from 1 to 100 weight percent of a hydrophilic monomer, and from 0 to 99 percent by weight of at least on non-hydrophilic monomer; and

    wherein said latex polymer composition forms films that are dispersible rather than soluble in tap water in that a film formed from the polymer breaks into small discrete particles that can be filtered out, and non-dispersible in aqueous solutions containing 0.5 weight percent or more of an inorganic salt; and

    wherein the films are further characterized in that divalent ions do not inhibit redispersibility in water.

The invention is thus directed to non-woven webs which retain their strength in the presence of a salt-containing medium, but readily disperse in tap water such that they may be flushed after use. The emulsion polymers utilized in connection with the Present Invention have a significantly different structure than solution polymers, even after the polymer composition coalesces into a film on a nonwoven web. Without being bound by a theory, it is believed the emulsion polymers form films by coalescence of discrete polymer particles which are separated by the stabilizing agent; this results in relatively weak bonds. Weaker bonds are advantageous in applications where water dispersibility is required. With solution polymerized resins, the polymer chains mix and entangle during film formation. The weak bonds formed by the emulsion polymer are fundamental to its dispersibility in tap water. For example, unlike the prior art, large amounts of extremely hydrophilic monomers such as acrylic acid are not needed to provide a water-dispersible composition. Less hydrophilic

monomers such as methacrylic acid may be used which generally accommodates emulsion polymerization techniques better.

5. That United States Patent No. 5,521,266 does not contain a description of an emulsion polymerized polymer which is dispersible in water such that a film breaks into small pieces and can be filtered out. Examples 1-3 of the '266 patent involve solution polymers which dissolve in water and accordingly cannot be dispersible as defined above. Examples 4 and 5 of the '266 patent involve emulsion polymers having the composition of Table 4.2, col. 15 of the '266 patent:

TABLE 4.2

Emulsion Polymer	LA	LMA	BA	MMA	MAA	2-EHA	VA
1C-E (Comparative)	50	0	0	49	1	0	0
2C-E (Comparative)	0	45	10	44	1	0	0
1-E	20	0	25	54	1	0	0
2-E	40	0	20	39	1	0	0
3-E	40	0	3	56	1	0	0
4-E	40	0	0	59	1	0	0
5-E	45	0	0	54	1	0	0
6-E	50	0	0	49	1	0	0
7-E	50	0	48	0	2	0	0
8-E	98	0	0	0	2	0	0
9-E	0	20	30	49	1	0	0
10-E	0	20	35	44	1	0	0
11-E	0	35	5	64	1	0	0
12-E	0	35	0	64	1	0	0
13-E	0	40	39	20	1	0	0
14-E	0	40	10	49	1	0	0
15-E	0	40	29	30	1	0	0
16-E	0	40	5	54	1	0	0
17-E	0	40	0	59	1	0	0
18-E	0	45	15	39	1	0	0
19-E	0	45	10	44	1	0	0
20-E	0	45	0	54	1	0	0
21-E	0	50	0	49	1	0	0
22-E	0	50	48	0	2	0	0
23-E	20	0	0	0	0	0	80
24-E	0	20	0	0	0	0	80
25-E	0	0	10	44	1	45	0
26-E	0	0	20	0	0	0	80

Note that the polymers are mostly alkylated organic esters and contain only 0, 1 or 2% methacrylic acid. Based on his experience, it is clear to him that these emulsion

polymers are not dispersible in water, nor would their dispersibility change in response to salt concentration. Accordingly, the products of the Present Invention are not suggested by their reference in any way.

6. As opposed to emulsion polymerization techniques, the '317 *Komatsu* reference discloses solution polymerized polymers. Solution polymerization techniques are fundamentally different from emulsion polymerization, and generally involve dissolving the monomer components in an organic solvent and initiating the polymerization, where the reaction components and polymer product are dissolved in the organic solution. In solution polymerization processes, there is typically only one phase. It is readily apparent that the polymers described in the '317 *Komatsu* patent are not "dispersible" in the sense defined above. That is, that a film can be broken into small pieces and filtered out. Rather, the polymers described simply dissolve in water. He has reviewed the '317 *Komatsu* patent carefully and it is clear to him that the binder resins described in the patent are water soluble. The abstract of the patent, for example, states that the polymers are water soluble in tap water, such that they could not be filtered out:

Disclosed is a process for producing a self-dispersing and salt-sensitive polymer by polymerizing the following monomers (A), (B) and (C) in a total concentration of 25 % by weight or above:

(A) 35 to 65 % by weight of acrylic acid,

(B) 10 to 45 % by weight of a vinyl monomer represented by the following general formula [I]:

$$CH_2=C(R^1)COOR^2 \quad [I]$$

wherein R^1 represents a hydrogen atom or a methyl group; and R^2 represents an alkyl group having 8 to 12 carbon atoms, and

(C) 20 to 45% by weight of a vinyl monomer represented by the following general formula [II]:

$$CH_2=C(R^3)COOR^4 \quad [II]$$

wherein R^3 represents a hydrogen atom or a methyl group; and R^4 represents an alkyl group having 2 to 4 carbon atoms in a mixed solvent comprising 50 to 90% by weight of an organic solvent having a solubility parameter of 10 $(cal/cm^3)^{1/2}$ or below and miscible with water and 50 to 10% by weight of water, neutralizing 2 to 15 molar % of the acrylic acid moiety of the polymer, distilling off the organic solvent while water is left, and further adding water thereto. The polymer produced by the process is soluble in tap water, but insoluble in an aqueous salt solution of a low concentration such as 0.2% aqueous salt solution. In case the polymer is used as a binder for a non-woven fabric or paper, it exhibits satisfactory strength and permeability to a body fluid when the resultant product is wet with the body fluid.

7. The undersigned Declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and

that such willful false statements may jeopardize the validity of the subject application or any patent issuing thereon.

Dated 23-July-2007

Steven P. Pauls, Sr.